ABSTRACT OF THE DISCLOSURE

[0078] A system and method for detecting a functional signal in retinal images. An optical imaging device comprises a stimulation light source, an interrogating light source, and a detector. The retina is stimulated by the stimulation light source. The retina is then illuminated by an interrogation light, and the reflected intensity from the retina is measured at an interrogating spectral band that indicates the state of hemoglobin saturation before and after visual stimulation. The optical changes that result from retinal neuronal activity are captured by the detector. The signal representing the state of hemoglobin saturation before and after visual stimulation is isolated. In an embodiment of the present invention, this signal is isolated using principle components analysis (PCA). In another embodiment of the present invention, blind source separation (BSS) and independent component analysis (ICA) algorithms such as extended spatial decorrelation and fast-ICA are used to isolate the functional signal from the retinal videos.